

The function of green belt Jatibarang as quality control for the environment of Semarang city

Cite as: AIP Conference Proceedings **1855**, 040007 (2017); <https://doi.org/10.1063/1.4985503>
Published Online: 15 June 2017

Titien Woro Murtini, Arnis Rochma Harani, and Loretta Ernadia



View Online



Export Citation

ARTICLES YOU MAY BE INTERESTED IN

[A system to preserve pedicab as cultural heritage in Solo city, Indonesia](#)

AIP Conference Proceedings **1855**, 040008 (2017); <https://doi.org/10.1063/1.4985504>

[Prediction of surface distress using neural networks](#)

AIP Conference Proceedings **1855**, 040006 (2017); <https://doi.org/10.1063/1.4985502>

[Impact analysis of freight vehicle access restriction \(A case study of Jakarta Intra Urban Toll way\)](#)

AIP Conference Proceedings **1855**, 040009 (2017); <https://doi.org/10.1063/1.4985505>

AIP | Conference Proceedings

Get **30% off** all
print proceedings!

Enter Promotion Code **PDF30** at checkout



The Function of Green Belt Jatibarang as Quality Control for the Environment of Semarang City

Titien Woro Murtini^{1,a)}, Arnis Rochma Harani¹, and Loretta Ernadia^{1, b)}

¹*Architecture Department, Faculty of Engineering, Diponegoro University, Semarang, Indonesia*

^{a)}Corresponding authors: titien_wm@yahoo.com

^{b)}arnis.rochma@gmail.com

Abstract. The quality of the healthy environment in a neighborhood city is decreasing in number. According to the government regulation, Act No. 26 of 2007, a city should have 20% of green areas from the total area of the city. Now, Semarang only has 7.5% of green areas from the total city area. One of the efforts made by the Government of Semarang is the establishment of a greenbelt in Jatibarang area. It consists of several parts, namely, the reservoirs in the green belt area and also the plant zone in other sectors. The reservoir has a function as the controller of water resources sustainability where the crops serve as the balance for the combination. Thus, it is interesting to study how the interplay of these two functions in a green belt area. The primary data used in this study was obtained from the locus of research by direct observation, interview, and physical data collection. Based on the data collection, data was then processed and analyzed in accordance with the indicators that had been compiled based on theories of reservoirs, green belts, and the quality of the urban environment. Government regulations regarding with the greenbelt and tanks were also used as references in the discussion. The research found out that the presence of the reservoir and the plants in the green belt of Jatibarang can improve the function of the green belt optimally which is a real influence for the improvement of the environment quality, especially water. The Greenbelt was divided into four zones, namely the Arboretum, Argo - Forestry, Ecotourism, Buffer - Zone also made the region became a beautiful greenbelt that brought a positive influence to environmental quality.

INTRODUCTION

Semarang city is the capital of Central Java province which is now growing in all areas. The development continues and as a consequence, the available land declines and land use conversions are carried out. One of these conversions occurred on green land area land use. It led to the continuous decline in the environmental quality of Semarang City. Environmental degradation was indicated by the conditions where Semarang only had 7.5% green area of the total city area in which based on Law No. 26 of 2007; the green area should be 20% of the total area of the city. A consequence, the numbers of flooding and landslide hazard continually increase in the rainy season as well as the increasing air temperature in Semarang City.

The Government of Semarang City made several attempts to expand the green areas including to build a city park and to multiply the green belt areas. One of those efforts was the designation of Jatibarang Green Belt Area. In this area, a green belt was designed with a variety of zones. One of them was the reservoir. According to the Local Government Regulation (PERDA) No. 22 of 2003, Article 1, the reservoir is a place / river water storage containers used for irrigation or other purposes. But in Jatibarang, the reservoir was designed as a single unit with a green belt area. It was perceived as one of the highlights to review the success of the tank balance and plant area in the green belt as an environment quality control in Semarang City.

THE CONDITION OF JATIBARANG AREA

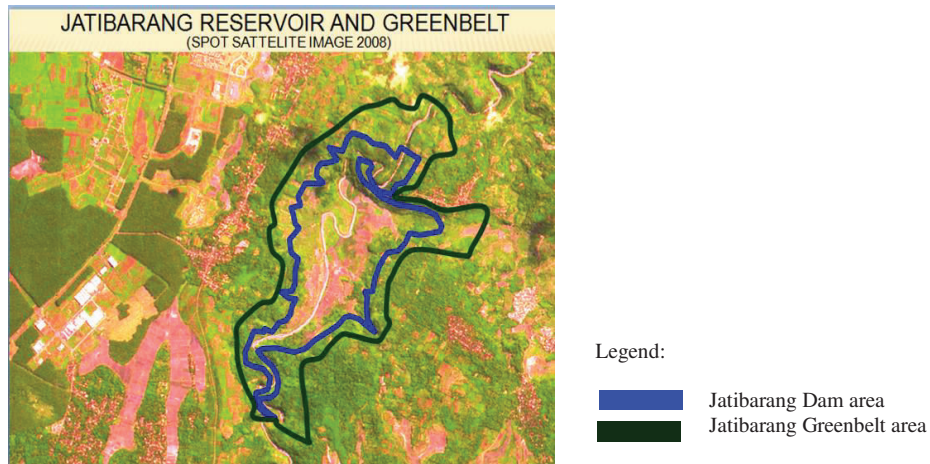


FIGURE 1. Map of Jatibarang Green Belt Area

Greenbelt Jatibarang Reservoir has a total area of 128.80 hectares located in the Jatirejo Village and Kandri Village, Gunungpati Subdistrict and Jatibarang Village and Kedungpane Village, Mijen District of Semarang. Therefore, Jatibarang Green Belt Area is bordered by four villages (Fig.1). Jatibarang reservoir already serves as flood control, power generator, and the source of raw water. In addition, the Jatibarang reservoir also serves as a tourist attraction in Semarang City including the greenbelt area.

According to Ref. [1], the general causes of declined number of green belt area in the major cities are: 1) industrialization, 2) urbanization, 3) inappropriate plan of economic development, 4) the absence of proper control mechanisms to maintain a green belt area, and 5) declined to carry capacity of the environment that exacerbates the urban conditions. So, the presence of the Jatibarang green belt was expected to solve those problems.

ZONE DEVELOPMENT IN JATIBARANG AREA

The greenbelt conservation area in Jatibarang Reservoir is divided into (Fig. 2):

- a. Arboretum
The arboretum is a conservation area with the collections of variety living plants for the needs of science, education, natural laboratory, and aesthetics. This area is located in segment 1 and 6.
- b. Argo - Forestry
Patterns and farming systems, with a combination of trees and crops, so, it is a mixed plantation of forest trees and fruit. This area is located in the segments 2, 3, 4, and 5.
- c. Ecotourism
An area of nature with the presence of tourism-based activities in parts 2 and 3.
- d. Buffer - Zone
An area that serves as the controller and processor of pollution so that water quality can be well-controlled as located in the fifth segment.

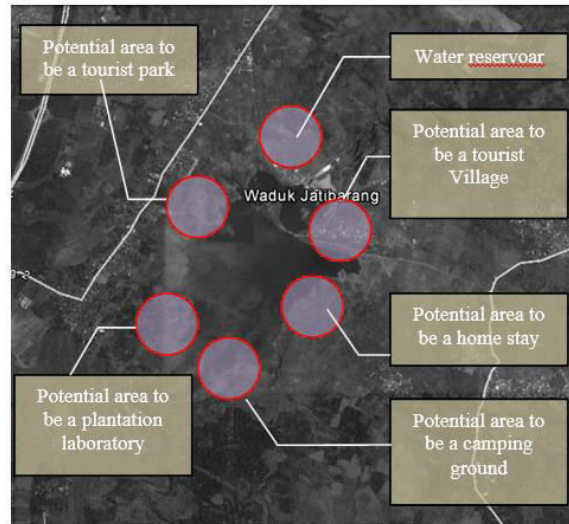


FIGURE 2. Zone Development of Jatibarang Green Belt Area

There are six segments of the working area of the Jatibarang Reservoir Green Belt with different functions, namely:

- a. Segment 1 is located in the Jatirejo Village with an area of 24.59 ha, where the Arboretum area is established with various plants collections, typical plants of the region in Indonesia, and herbs. As a greenbelt area, it balances the land function and it supports the conservation effort in maintaining Indonesia's natural wealth of medicinal plants by setting it up in the first segment. Reference [2] suggested that medicinal plants can improve the means of nature conservation.
- b. Segment 2 is located in the Kandri Village with an area of 13.84 ha, where the ecotourism and agroforestry regions with a variety of fruit crops (Fig. 3) are developed. Gunungpati is known as a region that produces a lot of fruit. The selection of segment 2 as a fruit crop was considered as highly potential for the success in improving the environment quality. Native fruits are cultivated in this area. Hence, this zone can also provide the additional revenue for the local community. So, it will not only maintain the quality of the environment, but also increase it at the same time.



(a)



(b)

FIGURE 3. Existing Condition at Segment 2 of Jatibarang Green Belt Area.

- c. Segment 3 is located in the Kandri Village with an area of 30.27 ha, where Agroforestry, long-tailed monkeys wildlife tours, open stage with a variety of fruit crops and forage plants for long-tailed monkeys are established. The green belt is in adjacent to Kreo Goa which is well-known as a tourist object for the number of animals.

These monkeys live in the protected forest. However, the number of the animals was declined since 2005, due to the changes in the circumstances. By providing and restoring the monkeys' habitat, it was expected it could save the living of the remaining animals in this area. The plant zone was expected as the resemblance of place where monkeys can live in safe. In fact, since the existence of the green belt, the number of monkeys actually increased represented by numbers of animals were proliferating. Gradually, this segment was evidenced to manage and maintain the sustainability of the environment quality successfully.



FIGURE 4. Existing Condition at Segment 3 of Jatibarang Green Belt Area.

- d. Segment 4 is located at the Kedungpane Village, at 23.53 ha area which serves as Agroforestry, Buffer-Zone, travel and fruit and flowers, as well as the office of the business with a variety of fruit trees and flowers. In this segment, a lot of fruit trees planted with green land use approach that provided results which can be utilized as a treatment of this region. So, the quality of the environment can be controlled accurately and enhanced. Similar with Ref. [3], the development of green belt which is optimized to suppress air pollution becomes the attention of the biophysical and socio-economic parameters (Fig. 5).



FIGURE 5. Existing Condition at Segment 4 of Jatibarang Green Belt Area.

- e. Segment 5 is located in the Kedungpane Village of 14.53 ha area that serves as the Agroforestry and Buffer-Zone with a variety of fruit crops. In this segment, fruit trees planted with green land use approach that provided results which could be utilized as a treatment of this region. Thus, the quality of the environment can be controlled accurately and enhanced. This is in line with Ref. [3] that the optimal development of green belt could suppress the air pollution, which becomes the attention of the biophysical and socio-economic parameters.

- f. Segment 6 is located in the Jatibarang Village and Kedungpane Village with a total area of 22.05 ha where Arboretum serves as the region with a variety of timber plants and fruit. This segment is a segment in the form of timbers used for the endurance of groundwater in the city of Semarang, in which it is expected to reduce flooding and landslides.

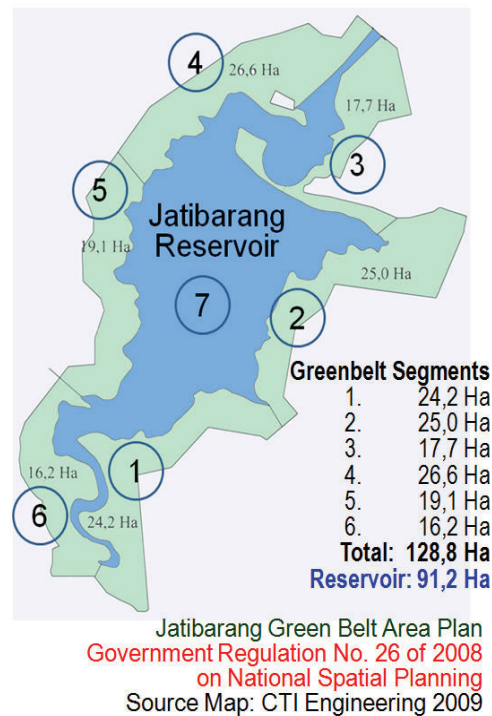


FIGURE 6. Jatibarang Green Belt Area Plan.

With the division of the green belt into four zones, namely the Arboretum, Argo - Forestry, Ecotourism, and Buffer – Zone, Jatibarang green belt became an interesting and complete green belt (Fig.6). The green belt is usually attractive if it is designed into an area that has the role in improving the quality of the environment as well as an interesting one. It is in accordance with Article 4 of The Government Regulation of Central Java Province No. 22 of 2003 regarding with the objectives of the protected area management, which are to improve the function of protection against soil, water, climate, flora and fauna and historical and cultural values of the nation and to maintain the diversity of plants, animals, ecosystems and natural uniqueness types.

The four zones in Jatibarang Green Belt had met the aspects as mentioned in the article. Thus, it is expected that the proper zoning will attain the objectives of a green belt area. The four zones fulfill the principle of sustainable development according to Ref. [4], which is a process of development in the forms of land, cities, businesses, communities, and so on should meet the needs of the present and also compromise the fulfillment of the requirements of future generations.

THE INFLUENCE OF JATIBARANG RESERVOIR IN GREEN BELT AREA

Conservation itself is derived from the word Conservation that consists of the phrase *con* (together) and *serve* (keep / save), which is defined as an understanding of the effort to maintain what we got (keep / save what you have), but in prudent (wise use). Conservation of water resources is an attempt to maintain the existence and sustainability of the circumstances, the nature and the function of the water resources in order to retain the viability including the sufficient quantity and quality to meet the needs of living beings, both in the present and in the future (Act. No. 7/2004). Reservoir conservation is the preservation of the green belt and the catchment area of the river including the preservation of soil and water that leads to the economic and ecological balance.

Jatibarang Reservoir is a place of water stored in as a reservoir to prevent flooding in Semarang City. With the establishment of this reservoir, water resources are maintained and the water can be used as a power plant. From the collected data, the flood level in the Semarang City decreased by 17% the flood level in the city of Semarang dropped to 17% after the establishment of the Jatibarang reservoir. Hence, it can be a parameter that the presence of reservoir in Jatibarang Green Belt supports the success of the function of green belt area. In addition, as the water resource conservation, it is able to reduce the flooding level in Semarang City.

CONCLUSIONS

1. The existence of reservoir in the Jatibarang Green Belt Area provides a positive value to improve the quality of the environment, especially water resources.
2. The division of Jatibarang Green Belt into four zones, namely the Arboretum, Argo - Forestry, Ecotourism, Buffer - Zone make it become an attractive and complete green belt that subsequently provide the improvement of the environment quality.
3. The ecological system area of teak goods is raised.

REFERENCES

1. C. C. Bae and M. Jun. "Counterfactual Planning. What if there had been no Greenbelt in Seoul" in *Journal of Planning Education and Research*, (2013).
2. G. Lestari. *Taman TOGA* (PT. Gramedia, Jakarta, 2008).
3. I. Setiawan. "Jalur Hijau (Green Belt) Sebagai Kontrol Polusi Udara Hubungannya dengan Kualitas Hidup di Perkotaan," in *Jurnal SMARTek*, Vol. 7, No. 2, pp 113 – 120, (1999).
4. G. H. Brundtland. *Our Common Future World Commission on Environment and Development (WCED)*, (Oxford University Press, New York, 1987).